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The Introduction of the Nile Perch into Lake Victoria and the Resulting Neo-Colonial Relationship

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I. The Nile Perch and its Introduction into Lake Victoria:

The Nile perch (Lates niloticus) is a fish weighing up to 440 pounds, that grows to lengths of up to six feet, and whose natural range is in Africa's lakes: Turkana, Volta, Maryut, Chad, and the rivers: Niger, Senegal, Nile, and Congo. In 1954, British colonial authorities under the Uganda Game and Fisheries Department introduced the fish into Lake Victoria intending to reduce the overfishing of tilapia, to develop the fishery's profitability, release a fish similar to a prehistoric one that once lived in Lake Victoria, and to introduce a fish to prey on haplochromines[1]. The introduction of the fish has had a variety of political and social consequences producing a series of entities who win as a result of the Nile perch introduction, and a set of entities that lose and have been adversely affected by the introduction. What has seen adverse effects from introduction policy includes: the ecology of Lake Victoria, the traditional fishing communities of the Lake Victoria Basin (LVB), the governments who administer Lake Victoria, and Lake Victoria's commercial fishery. The Nile perch is considered to be one of the world's 100 worst invasive species according to the International Union for Conservation of Nature (IUCN)[2]. Despite its perceived negative status, capitalism still continues to exploit what many consider to be an 'invasive' or an 'alien' species thus creating a group of winners. The winners from this situation are locations that import Nile perch such as the Global North (a classification of more developed traditionally core countries who share similar historic and economical characteristics primarily located in the northern hemisphere) most notably the fish's biggest foreign importer, the European Union (EU). This has led to the continuing of a neo-colonial, core-periphery relationship with Europe (the core) continuing the exploitation of

[1] Robert M. Pringle. "The origins of the Nile perch in Lake Victoria." *BioScience* 55, no. 9 (2005): 782-785.
[2] Sarah Lowe, Michael Browne, et al. *100 of the world's worst invasive alien species: a selection from the Global Invasive Species Database*. Vol. 12. Auckland: Invasive Species Specialist Group, 2000; 6, 11.

Africa's (the periphery's) resources. In this system wealthy industrialized capitalist countries (core countries) benefit from and control the global market, while resources flow from underdeveloped periphery countries to benefit the core leading to forms of dependency for peripheral countries to pursue development. The introduction of the Nile perch in Lake Victoria has created a winner in the Global North, while it has simultaneously established a growing set of injured parties in its wake fostering dependency and a neo-colonial relationship.

II. The Changing Ecology of Lake Victoria:

The introduction of the Nile perch into Lake Victoria has radically altered the lake's ecology. The altered ecology of Lake Victoria is a losing prospect as the introduction has led to a mass extinction and endangerment of the lakes smaller fish species[3]. The Nile perch is a near-top level predator where its only effective measure of population control are humans. What makes the Nile perch so successful is that it is a prolific breeder where an adult female produces up to 16 million eggs per year[4]. This rapid rate of reproduction has fundamentally altered the trophic web of the world's second largest freshwater lake[5]. It is estimated that the haplochromine biomass of Lake Victoria was reduced from 80% of the lake's total to less than 1% of the lake's total biomass after the introduction of the Nile perch. It is also estimated that around 40% of the lake's haplochromine species are now extinct[6]. Many authorities believe this to be the largest extinction event of vertebrates seen in the twentieth century. While the Nile perch has impacted

[3] *Ibid*, 3.
[4] Richard Ogutu-Ohwayo. "Reproductive potential of the Nile perch, Lates niloticus L. and the establishment of the species in Lakes Kyoga and Victoria (East Africa)." *Hydrobiologia* 162, no. 3 (1988): 193.
[5]Richard Abila and Eirik Jansen (1997). Socio-economics of the Nile Perch Fishery on Lake Victoria. *From Local to Global Markets. The Fish Exporting and Fishmeal Industries of Lake Victoria: Structure, Strategies and Socio- Economic Impacts in Kenya* (rep.) Nairobi: IUCN-The World Conservation Union (1997): 1. (The total surface area of Lake Victoria is 26,590 miles ^{2} it is split between three countries with Tanzania possessing 49% of the Lake, Uganda 45% and Kenya 6%. It is the second largest freshwater lake in the world by surface area behind only North America's Lake Superior with 31,700 miles ^{2}.)
[6] Frans Witte, Tijs Goldschmidt, et al. "Species extinction and concomitant ecological changes in Lake Victoria." *Netherlands Journal of Zoology* 42, no. 2 (1991): 214.

habitats for a variety of species, we must question the application of the term 'invasive species' when it is applied to the Nile perch. Despite the mass extinction, trophic cascades have emerged in the lake's ecosystem. The reduction of haplochromine cichlids has reduced competition for zooplankton allowing the silver cyprinid (Rastrineobola argentea) to flourish. This boom in silver cyprinids has led to a rise in aviary predators such as pied kingfishers (Ceryle rudis).

Under a political ecology framework we can deduce that the field of 'invasion biology' is built upon an assumption that a past condition should be restored because the current condition is flawed[7]. When we look beyond this invasion paradigm we can see that the lake has moved towards a new equilibrium establishing a novel ecology. Attempts to restore Lake Victoria to an idealized past are often misguided because it is impossible to restore the former state of the lake. Furthermore, humans through their community or state are not always the best managers of nature and any attempts to restore Lake Victoria's past will be done to benefit humans[8]. Global North conservation organizations will pursue the restoration of the lakes marine biota to serve their conservation goals paying little regard to the emergent ecology. It is difficult to predict what the outcome of attempted changes may be as they may cause more harm than benefit. Capitalism has still made use of the novel ecology in order to meet Nile perch export demand from abroad. The biggest international importer has been the Global North and more specifically the EU. In Europe, the Nile perch has emerged as a popular whitefish to replace declining imports of cod that began in the 1980s and 1990s. Despite its popularity, the existence of the Nile perch leads to the depletion of smaller fish such as the haplochromine, which has consequences for the traditional fishing communities in the LVB.

[7] Paul Robbins and Sarah A. Moore. "Ecological Anxiety Disorder: Diagnosing the Politics of the Anthropocene." *Cultural Geographies* 20, no. 1 (2013): 4.
[8] Paul Robbins. "Research." University of Wisconsin-Madison, Nelson Institute for Environmental Studies. Accessed August 1, 2017. http://faculty.nelson.wisc.edu/robbins/research/.

III. The Destruction of Traditional Riparian Fishing Villages:

Traditional fishing communities that surround Lake Victoria have suffered significant harms following the introduction of the Nile perch. The quality of life in these villages has declined with the depletion of haplochromine. Traditional fishing LVB communities are highly susceptible to malnutrition or undernutrition which includes micronutrient insufficiencies, stunted growth, and a low body weight for ether height and/or age. Instances of malnutrition in LVB communities have risen since the introduction of the Nile perch. In Kenya's LVB region 30% of children had stunted growth while in Uganda the rate was 45.5%; and in Kenya, 15% of children were underweight while in Uganda the figure was 23%. This is a significant problem as 60% of all deaths of children under the age of five comes from malnutrition[9]. Poverty rates for the entire LVB region are staggering and do not only affect children as 5.7% of mothers suffer from chronic malnourishment[10]. Individuals from these communities do not consume Nile perch often for a range of social and economic reasons. The first reason being there is often a disdain for the taste of the fish as the local communities preferred the haplochromine that had been consumed for generations before the introduction of the Nile perch[11]. Secondly, Nile perch are difficult to catch through traditional fishing methods. Nile perch often destroy traditional fishing basket traps and consume the fisher's catches of smaller fish[12]. Other traditional methods used such as beach fishing with small size netting of less than 5 inches have been banned in an effort

[9] DM Sabwa Karanja. "Health, Diseases, and Nutrition in the Lake Victoria basin." *OceanDocs* 30197 (2006): 18-19.
[10] Kim Geheb, Sarah Kalloch, et al. "Nile Perch and The Hungry of Lake Victoria: Gender, Status and Food in an East African fishery." *Food Policy* 33, no. 1 (2008): 91.
[11] Pringle, Robert M. Pringle. "The Nile perch in Lake Victoria: Local Responses and Adaptations." *Africa* 75, no. 4 (2005): 515.
[12] T.O. Acere. "The Controversy over Nile Perch, *Lates niloticus,* in Lake Victoria, East Africa." *Uganda Fresh Water Fisheries Research Organization.* Jinja, Uganda (1988): 4.

to protect juvenile Nile perch[13]. The final reason Nile perch is not often consumed locally is because it is too expensive and typically reserved for the export market where it will fetch a higher price. Nile perch is exported to meet the nutritional needs of consumers in the Global North and cities in the Global South. In this scenario, LVB communities struggle with malnutrition while fish with sufficient nutritional value is exported to people who have the ability to pay a higher price for the fish.

Traditional fishing community needs in the LVB are ignored by the government. Communities with nutritional deficiencies have resorted to fishing for silver cyprinid putting a strain on the species. Kenya has implemented an annual two-month fishing ban on the cyprinid under the Kenya Marine and Fisheries Resources Institute (KEMFRI) with hope that stocks will rebound. This ban restricts the nutritional needs of traditional fishing communities limiting often the only source of protein these communities have. Policies such as these show that the government is indifferent to the needs of marginalized people by implementing restrictive measures in areas rife with poverty and malnutrition. Organizations such as the African Centre for Technology and Science (ACTS) and the IUCN have agreed that current laws and policies enforced by Kenya, Tanzania, and Uganda are poorly adapted to the needs and challenges traditional fishing LVB communities face[14]. The governments that surround Lake Victoria continue to marginalize these communities through policies that incentivize and protect commercial fishers. The bilateral trade and tax revenues that result from commercial fishing and sport fishing tourism have resulted in the adoption of government policies to protect these industries at the direct expense of traditional fishing communities. Governments have

[13]Special Correspondent in Mwanza. "Overfishing sounds death knell for Nile perch in Lake Victoria." *The EastAfrican*. September 25, 2014. Accessed August 07, 2017. http://www.theeastafrican.co.ke/news/Overfishing-sounds-death-knell-for-Nile-perch-in-Lake-Victoria/2558-2464674-10jmnj7z/index.html.

[14] "Lake Victoria Community Takes Issue with Fishing Ban." *Panapress*. April 03, 2002. Accessed August 01, 2017. http://www.panapress.com/Lake-Victoria-community-takes-issue-with-fishing-ban--13-457494-17-lang1-index.html.

encouraged greater mechanization such as the use of boats with outboard motors. However greater mechanization actually leads toward more poverty for LVB communities, which can be seen first-hand with Tanzania's neighbor Zambia. Zambia's Mweru-Luapula fishery has seen increased poverty levels within small-scale inland fishing communities as the result of increased catch rates from greater mechanization. The cause of poverty in these communities occurs as greater mechanization escalates exploitation levels by smaller fishers who attempt to compete with large scale fishers whose catch simultaneously increases with more advanced technological inputs. The increased exploitation is difficult to sustain over long periods of time especially when the communities face greater population pressures[15]. The communities that are deeply integrated in the fish trade often do not see economic improvement within their communities or reductions in poverty. This occurs because funds are most often reinvested in the fishing industry rather than in the community itself. This leads to a lower potential for long term growth as many youths decide to forgo school to enter the fishing industry. The economic gains from fishing have not allowed for structural sustainable development to occur in the LVB, but instead have led to dependency[16]. Traditional LVB communities have suffered injurious effects as a result of Nile perch introduction. This is because youths forgo school to enter the commercial fishing industry, and traditional fishing has been rendered ineffective as practices have been banned by the government and traditional fish stocks have been depleted by the Nile perch or commercial fishers. These marginalized communities suffer as a direct consequence of Nile perch consumption elsewhere.

IV. Commercial Fishing is a Losing Proposition in Lake Victoria:

[15] Bram Verelst. "Managing inequality: the political ecology of a small-scale fishery, Mweru-Luapula, Zambia." *Journal of Political Ecology* 20 (2013): 14.
[16] Martin Van Der Knaap, Martin and Willem Ligtvoet. "Is Western consumption of Nile perch from Lake Victoria Sustainable?." *Aquatic Ecosystem Health & Management* 13, no. 4 (2010): 430.

The industrial fisheries that profit from the Nile perch may be seen as winners when in fact they are losing side of the policy. Commercial fishing has blossomed into a very lucrative industry with an economy of agglomeration that surrounds the catch of the Nile perch. In 2014, Nile perch exports were estimated to be $325 million USD between the countries that surround Lake Victoria; and in Uganda fish represents the country's second biggest export behind coffee[17]. The demand for Nile perch has been increasing both internally and abroad in places such as South Sudan, Rwanda, Burundi, the Democratic Republic of Congo, the Middle East, Europe, Australia and the United States. In this case it appears that the Nile perch is a winning proposition, however, it is in fact losing because large amounts of the population and economy have become overly dependent on the fish. The Nile perch's profitability has led to its exploitation from overfishing and is ultimately leading it toward its decline. Nile perch biomass has been steadily decreasing since August 1999 from 1.9 million tonnes (82% of Lake Victoria Biomass) to 227,000 tonnes (14.9% of Lake Victoria biomass) in August 2008[18]. More fishers have continued to enter the market hoping to capitalize on the Nile perch boom that began in the 1980s[19]. With the reduction of the Nile perch there has been a decline in the livelihoods of individuals involved in the fishing industry. The economy of the LVB has become so dependent on fish exports that a collapse of the fishing industry would increase the region's already staggering poverty rates. Many within the fishing industry do not have a formal education and their employment prospects are limited to fields that have negative externalities for Lake Victoria. The other major employment opportunity in the LVB is that of sand mining. Sand

[17] Kabendera, Erick. "Tanzania lobbies Kenya, Uganda to impose ban on fishing of Nile." *The EastAfrican*. October 18, 2014. Accessed August 03, 2017. http://www.theeastafrican.co.ke/business/Tanzania-lobbies-Kenya--Uganda-to-ban-fishing-Nile-Perch/2560-2490758-13dtsu1/index.html.
[18] Robert Kayanda, Anthony M. Taabu, et al. "Status of the Major Commercial Fish Stocks and Proposed Species-Specific Management Plans for Lake Victoria." *African Journal of Tropical Hydrobiology and Fisheries* 21 (2009): 16.
[19]Geheb, et al., Nile Perch and The Hungry of Lake Victoria, 87 (In 1983 Lake Victoria contained an estimated 12,041 fishing vessels and in 2004 Lake Victoria contained an estimated 51,712 fishing vessels.)

mining has very negative externalities including increasing bank erosion, lake pollution, and further harming the Lake's fishery by destroying fish spawning grounds[20]. Lake Victoria's industrial fishers face a predicament as they are very dependent on the commercial value of the fish having little economic prospects outside of commercial fishing.

Lake Victoria's border countries are on the losing end of the Nile perch introduction policy because of their involvement with commercial industrial fisheries. The increased competition for Nile perch amongst a declining supply has led to tensions amongst the Lake Victoria countries. This can be seen in June 2016 with Uganda deploying its military forces to guard its waters from foreign fishers. This has led to heightened tensions around the disputed Mingingo Island with Kenya that could potentially escalate into a greater conflict[21]. Declining fish stocks have led the East Africa Community (EAC)[22] to launch the Lake Victoria Fisheries Management Plan III (FMP III) 2016-2020. The goal of FMP III is the "Recovery of biomass of Nile perch with Sustainable utilisation of fisheries resources of Lake Victoria basin with equitable opportunities and benefits"[23]. This is a step forward but multilateral agreements to stop unsustainable fishing have been difficult to achieve or have been unsuccessful in the past. FMP III has the goal to allow the Nile perch to rebound, however it is still not clear if this approach will be successful. If the approach is successful it would continue with the marginalization of the LVB traditional fishing villages further destroying the haplochromine by not allowing them to

[20] Nyakeya Kobingi, Philip Okoth Raburu, et al. "Assessment of pollution impacts on the ecological integrity of the Kisian and Kisat rivers in Lake Victoria drainage basin, Kenya." *African Journal of Environmental Science and Technology* 3, no. 4 (2009): 97.
[21] Mel Frykberg. "Ugandan military guards Lake Victoria's dwindling fish stocks." *IOL News*. March 13, 2017. Accessed August 07, 2017. https://www.iol.co.za/news/africa/ugandan-military-guards-lake-victorias-dwindling-fish-stocks-8171045.
[22] EAC partner countries include Kenya, Burundi, Rwanda, South Sudan, Uganda, and Tanzania
[23] "Fisheries Management Plan III (FMP III) for Lake Victoria fisheries launched in Arusha." *East African Community: One People, One Destiny*. June 28, 2016. Accessed July 28, 2017. https://www.eac.int/press-releases/488-768-190-fisheries-management-plan-iii-fmp-iii-for-lake-victoria-fisheries-launched-in-arusha.

have the opportunity to rebound[24]. If the Nile perch fishery collapses so does the multimillion dollar industry it supports which ultimately harms the people and governments of Uganda, Tanzania, and Kenya. If measures to preserve the fish are successful then some of the regions most marginalized people are further oppressed continuing their losing situation.

V. The Winner from Nile Perch Introduction:

While there have been many injured parties from the introduction of the Nile perch into Lake Victoria there is one clear winner that emerges from the policy which is the Global North and most notably the European Union. Around 80% of the Nile perch harvest is processed and exported primarily to Europe, Asia, Israel, the Middle East, and the United States[25]. The EU is the primary consumer of Nile perch and in 2004 exports to the EU totaled €190 million ($224 Million USD)[26]. European demand for the fish is flexible and can buy whitefish elsewhere such as Central Asia if Nile perch prices are too high. In this situation Europe has leverage to force low prices on Nile perch exports. In order to remain competitive fish prices are lowered resulting in less money going into the LVB. This stifles the LVB's economic development as there is not enough capital to develop industries outside fishing. This directly continues a core-periphery colonial legacy where the core intentionally keeps the periphery weak for its benefit in this case it is to produce cheap fish. The EU is in a unique win-win position when it comes to the Nile perch. If the Nile perch collapses the EU has the ability to claim they helped reduce or eliminate one of the world's worst 'invasive' species. If the fishery collapses the EU will buy whitefish from elsewhere, as it did when the Atlantic northwest cod fishery collapsed. If the fishery

[24] John Balirwa, Brett Ogilvie, et al. "Haplochromine Habitat Study." from *Bujagali Hydropower Project Uganda*, (2001): 4, 22. (Many species of haplochromine have begun to rebound with lower number of Nile perch which includes some species such *as Neochromis simotes* that experts once believed was extinct but has now reappeared)
[25] Jennifer Lee Johnson. "From Mfangano to Madrid: The Global Commodity Chain for Kenyan Nile perch." *Aquatic Ecosystem Health & Management* 13, no. 1 (2010): 22.
[26] Helga Josupeit. *The Market for Nile Perch*. FAO, 2006, 43.

recovers the EU has a cheap source of whitefish and can tell the story that they are helping the economic development of the LVB by purchasing the fish. The periphery does not have flexible options as their dependency is evident: 90% of Tanzania's fish exports are Nile perch[27]. This is a continuation of the core-periphery problem where the Global North is forcing Global South dependency and exploiting its resources without taking into account the breadth of consequences Nile perch consumption has for the LVB.

VI. Lake Victoria's Catch -22:

While Europe and the Global North have a win-win situation the LVB is stuck in a catch-22. Much of the rhetoric from Global North environmentalists has been to remove the fish because of its 'invasive' status. This mindset is divorced from the reality of the situation occurring in the LVB where many communities are dependent on the fish. This leads to a catch-22 where the LVB is stuck in a losing proposition no matter what the outcome is. If the Nile perch continues its presence in the lake, the lake could see a decline of more fish species and likely more extinctions, further harming marginalized LVB traditional fishing communities. If the fish is eliminated a lucrative industry will have collapsed and large numbers of individuals will be out of work. Many of these individuals with no education will likely enter the sand mining trade which presents other significant environmental hazards to Lake Victoria. Governments will see a decrease in trade, and tax revenue hampering future development. Ultimately the African countries that surround Lake Victoria are in a catch-22 with losing options, while the Global North is locked into a win-win situation.

VII. Conclusion:

[27] Jennie Bergman, and Sandra Vieweg. *Nile Perch Export and Welfare around Lake Victoria- Has the boom in exports been positive for welfare?* Master's thesis, University of Gothenburg, 2012. Gothenburg: 2012. 7.

The introduction of the Nile perch into Lake Victoria has left its border countries (the periphery) as injured parties while it has allowed the core (Europe and the Global North) to win by continuing a neo-colonial relationship. In this relationship the periphery is intentionally kept weak and used as a source of raw goods and resource extraction. The social and political dynamics of these communities in the LVB have been altered with the emergent novel ecology. These changes are marked by international politics with greater tensions, community dependency on Nile perch exports, and the increasing poverty and malnutrition in the LVB as their food goes elsewhere to meet the nutritional needs of higher paying consumers. Any attempts to bring back Lake Victoria's old ecology are misguided as previous systems have been upended. The policy introducing the Nile perch occurred in an era of colonialism. This legacy is continued today through a neo-colonial relationship where the Global North continues to exploit the LVB.

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